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E. C. Valkhoff



ILLUSTRATIONS OF FUNGI.

MYCOLOGIA

VOL. V

JANUARY, 1913

No. 1

ILLUSTRATIONS OF FUNGI—XIII

WILLIAM A. MURRILL

The accompanying plate illustrates several species of boletes collected either near Bronx Park, New York City, or in the vicinity of Stockbridge, Massachusetts. These are fleshy fungi with tubes instead of gills, usually occurring on the ground in woods during late summer and autumn. They are difficult to distinguish, even in the fresh state, and when the large amount of water they contain is eliminated the dried specimens bear little resemblance to the originals.

Many of the best edible fungi in temperate regions belong to this group, and the dangers of being poisoned are relatively small. Species with bitter or otherwise objectionable taste should be avoided, and especially all plants having red or reddish tube-mouths. The sensitive bolete, which promptly turns blue when touched or broken, has also caused mild poisoning in some cases. Many species have not been thoroughly tested, however; hence it is wise to eat sparingly of all such plants until well known.

For a complete treatment of the Boletaceae known to occur in this country, the student is referred to NORTH AMERICAN FLORA, volume 9, part 3, where the species are fully described and arranged under eleven genera with specific keys.

Gyroporus castaneus (Bull.) Quél.

CHESTNUT-COLORED GYROPORUS

Plate 80. Figure 1. $\times 1$

Pileus convex to subexpanded, slightly depressed, gregarious,
[MYCOLOGIA for November, 1912 (4: 289-349) was issued November 23, 1912]

3-7 cm. broad; surface smooth, dry, minutely but densely tomentose, orange-brown, fulvous, or reddish-brown; margin thin, usually paler; context white, firm, nutty in flavor, unchanging when wounded; tubes depressed, sinuate, short, watery-white becoming light-yellow to dark-cremeous, mouths angular, small, stuffed when young, edges thin, entire; spores ellipsoid, smooth, hyaline to pale-yellowish, $8-9 \times 4.5-5.5 \mu$; stipe subattenuate above and below, cylindric or somewhat flattened, tomentose, bright-brown, lighter at the apex, brittle, loosely stuffed, with a small cylindric cavity at the center, 4-5 cm. long, 6-10 mm. thick.

This species is common in Europe and the United States in sandy soil at the edges of woods. It is rather small, and varies in color from orange-brown to chestnut; the flesh is white, unchanging, of mild flavor, and edible.

***Ceratomyces auriporus* (Peck) Murrill**

GOLDEN-PORED CERIOMYCES

Plate 80. Figure 2. $\times 1$

Pileus circular, plano-convex, 2-4 cm. broad, 0.5-1 cm. thick; surface reddish-brown or yellowish-brown, rarely grayish-brown, sometimes brown with a reddish-yellow tint or reddish-brown in the center and olivaceous toward the margin, glabrous or minutely tomentose, slightly areolate at times with age, the interstices appearing yellow, usually dry, but somewhat viscid in wet weather; margin even, thin, somewhat obtuse, slightly inflexed on drying, concolorous; context firm, fleshy, 3-5 mm. thick, white, unchangeable, tinged with red under the cuticle, at first mild, then unpleasant to the taste, the cuticle decidedly acid; tubes plane or convex, adnate or nearly free, with a broad shallow depression about the stipe, 3-5 mm. long, bright golden-yellow, unchanging, even after years in the herbarium, mouths concolorous, variable in size, small and circular when young, medium or large and irregularly polygonal when old, edges thin, entire; spores oblong-ellipsoid, curved at one end, lemon-yellow, $8-10 \times 4-5 \mu$; stipe central, short, slender, curved, tapering upward, nearly glabrous, pulverulent under a lens, slimy in wet weather, concolorous or paler, slightly striate above from the decurrent edges of the tubes, solid, white or discolored-yellowish tinged with red within, 2-4 cm. long, 4-8 mm. thick.

Common in thin, dry woods and on shaded roadsides from New England to Alabama, and readily distinguished by its beautiful

golden tubes, which remain for years after drying without changing color.

Rostkovites granulatus (L.) P. Karst.

GRANULATED ROSTKOVITES

Plate 80. Figures 3, 4. $\times 1$

Pileus subhemispheric to nearly plane, gregarious, rarely cespitose or solitary, 4-10 cm. broad, 1-1.5 cm. thick; surface very viscid, with easily separable cuticle, very variable in color, usually pinkish-gray to reddish-brown fading to yellowish, often obscurely spotted, especially at the center; margin sterile, projecting, incurved and somewhat appendiculate when young; context thick, compact, elastic, pale-yellow next to the tubes, white above, unchanging when wounded, taste mild, somewhat mucilaginous; tubes short, less than 5 mm., adnate, subdecurrent, plane in mass, pale-yellow to dirty-yellowish, unchanging when wounded, mouths simple, subcircular, irregular, edges rather thick, flecked with pinkish-brown glandules; spores fusiform, pale-yellowish-brown, $7.5-9.5 \times 2.5-3.5 \mu$; stipe short, thick, subequal or enlarged below, white or pale-yellow, dotted with pinkish-brown droplets which become darker on drying, solid, white within, 2.5-5 cm. long, 1-1.5 cm. thick.

Common in Europe and temperate North America, usually in open woods near coniferous trees. The figures show the more usual reddish-brown form, as well as the albino form, of this excellent edible species.

Rostkovites subaureus (Peck) Murrill

Boletus americanus Peck

GOLDEN ROSTKOVITES. AMERICAN BOLETUS

Plate 80. Figure 5. $\times 1$

Pileus thin, convex to expanded, sometimes umbonate, 5-10 cm. broad; surface very viscid, yellow, often dotted or streaked with bright-red, dingy with age, sometimes spotted from the drying of the gluten; margin slightly tomentose or appendiculate when young; context comparatively thick, fleshy-tough, pale-yellow, pinkish-gray when wounded, taste mild; tubes adnate, scarcely decurrent, plane in mass, bright-yellow to dull-ochraceous flecked with yellowish, exuding drops which blacken with age, mouths rather large, angular, edges obtuse; spores oblong-ellip-

soid, smooth, ochraceous-ferruginous, $8.5-11 \times 4-5 \mu$; stipe slender, tapering upward, yellow, darker toward the base, covered with numerous brownish or reddish-brown glandular dots which blacken with age, solid, yellow within, 4-7 cm. long, 4-8 mm. thick.

This species resembles the preceding and occurs in similar localities, but is confined to eastern North America. The specimens figured did not show the incarnate dots or streaks which often appear on the cap, affording a good distinguishing character. *Boletus flavidus* Fries, of Europe, is closely related.

***Ceriumyces subglabripes* (Peck) Murrill**

SCURFY-STEMMED CERIOMYCES

Plate 80. Figure 6. $\times 1$

Pileus circular, rather thin, subconic or convex to nearly plane, occasionally cespitose, 3-10 cm. broad; surface glabrous, subviscid when moist, rugose at times, usually so when dry, reddish, pale-chestnut, grayish-brown, golden-brown, or rarely darker-brown, margin regular, concolorous; context white or whitish, unchangeable, of mild flavor; tubes plane or convex, adnate or depressed, lemon-yellow, becoming greenish-yellow or darker from the maturing spores, mouths circular to angular, regular, rather small, edges entire; spores oblong-fusiform, greenish-brown when fresh, soon changing to ochraceous-brown, $12-15 \times 4-5 \mu$; stipe central, cylindric, equal or slightly tapering upward, light-yellow without and within, sometimes tinged with red near the middle or lower down, striate but not reticulate, ornamented with small, pallid, scurfy particles, which sometimes partially disappear with age, 5-7 cm. long, 8-15 mm. thick.

On the ground in rather thick deciduous woods from Nova Scotia to New York. It was impossible to reproduce in the illustration the small scurfy particles on the stem which suggested the specific name. The section shows the usual smooth form of the cap, while the other figure represents the exceptional rugose form.

***Ceriumyces bicolor* (Peck) Murrill**

TWO-COLORED CERIOMYCES

Plate 80. Figure 7. $\times 1$

Pileus somewhat irregular, firm, convex, 5-10 cm. broad; surface dry, glabrous or finely tomentose or squamulose, at times

rimose-areolate with age, apple-red or purplish-red, often fading or becoming stained with yellow when old, margin irregular, sometimes upturned; context flavous, changing slowly to blue at times when wounded, then back to flavous, taste mild; tubes short, adnate, nearly plane, flavous when young, becoming ochraceous with age, changing slowly to blue or greenish-blue when wounded, mouths angular, of medium size, 2-3 to a mm.; spores fusiform, smooth, pale-ochraceous-brown, $10-12 \times 4-5 \mu$; stipe nearly equal, firm, solid, yellow or red, sometimes slightly reticulate at the top, changing to greenish-blue when bruised, smooth, nearly glabrous, showing dark dots under a lens, solid, flavous within, changing slowly to blue, 4-10 cm. long, 0.7-1.5 cm. thick.

This very beautiful species may be looked for in open deciduous woods from New England to North Carolina and west to Ohio and Kentucky. The pileus is red or purple, lacking the bloom found in *C. Peckii*, the tubes are yellow, soon changing, and the stipe is yellow or red, without the distinct reticulations found both in *C. Peckii* and *C. speciosus*. The larger plant figured represents the stage in which the bright colors found in young specimens have somewhat faded.

NEW YORK BOTANICAL GARDEN

THE GENUS KEITHIA

ELIAS J. DURAND

(WITH PLATE 81, CONTAINING 11 FIGURES)

Dr. J. J. Davis has been good enough to place in my hands for study material of a discomycetous fungus parasitic on *Thuja*, which was collected by him in Wisconsin. It was first found July 14, 1908, at Mellen, Ashland Co., about twenty-five miles from Lake Superior, where, at two points along Bad River, *Thuja* was found bearing the fungus but not very abundantly. In July, 1909, the fungus was again met with in Oconto Co., in the Green Bay district, where it was very abundant on the same host. It seems probable, therefore, that the parasite is rather widely distributed in the northern part of Wisconsin.

Examination of the fungus showed its affinities to be with the genus *Keithia* Sacc., and it was named provisionally *K. thujina* Durand.¹ At that time I had not seen specimens of *K. tetraspora*, a European form, the typical and only described species of the genus. More recently, however, authentic material of that and of another allied species has become available which enables me to present the following account of this little-known parasitic group.

The genus *Keithia* was established by Saccardo² to include the single species described as *Phacidium tetrasporum* Phil. & Keith,³ a parasite of *Juniperus*, in Scotland. The genus was referred to the Phacidiaceae, from the other members of which it differed in its 4-spored asci, and its colored spores divided by a single septum into two unequal cells. Authentic specimens of *Phacidium tetrasporum* collected at Forres, Scotland, June, 1880, by Rev. J. Keith, now in the New York State Museum of Natural History, at Albany, have been examined. A related species parasitic on *Tsuga*, in New Hampshire, was described by Dr. Farlow, in 1883,

¹ Trans. Wisc. Acad. Sci. Arts Let. 16: 756. 1909.

² Syll. Fung. 10: 49. 1892.

³ Gardeners' Chronicle, N. S. 14: 308. 1880.

under the name *Stictis Tsugae*.⁴ Examination of authentic material has shown it to belong in *Keithia* rather than in either *Stictis* or *Propolidium*, to which it was referred by Saccardo. The genus *Keithia*, therefore, is known to possess three species, all of which are parasitic on the leaves of conifers. One is on *Juniperus*, in Europe, the others on *Tsuga* and *Thuja*, respectively, in America.

Phillips and others have referred the parasite of juniper to the Phacidiaceae on account of its dark color, and its supposed laciniate method of dehiscence. Maire and Saccardo in describing the genus *Didymascella* (later regarded by Maire as a synonym of *Keithia*) remarked that it certainly belongs nearest to the Phacidiaceae. So long as knowledge of the genus was confined to the originally described species such a reference seems not at all remarkable. Further study of the group, especially of the two American representatives, throws a somewhat different light on its affinities, and seems to indicate that it might better be referred to the Stictidiaceae. Maire has pointed out, with good reason, that in the case of *K. tetraspora* the fungus itself does not split in a laciniate manner, but that the lobes are really formed of the epidermis of the host, which is ruptured by the expanding ascoma beneath.

There seems little room for doubt that the three species here included in *Keithia* are congeneric. The habit, all being parasites of coniferous leaves; the erumpent ascomata bursting the epidermis only; the uniformity of structure of the poorly developed excipulum; the small number and peculiar septation and color of the spores, all indicate that we are dealing with a very compact group. Comparison of these three species shows that in the case of *K. thujina* and *K. Tsugae* the color is much brighter than in *K. tetraspora*, and the covering epidermis is thrown off as a scale rather than splitting stellately. When completely moist the ascoma becomes somewhat elevated and cushion-like. The general resemblance of these plants to *Propolis faginea* is so great that it seems that they must be associated in the same family. Sections show that in all species of *Keithia* the excipulum and hypothecium are very poorly developed, but certainly are not lacking as stated

⁴Appalachia 3: 245. 1883.

in the description of *Didymascella*. The substance of the ascoma is soft and waxy when fresh. On the basis of these characters I believe that the affinities of *Keithia* are not with the Phacidia-ceae, with which European authors have associated it, but with the Stictidiaceae, to which the parasite on *Tsuga* was originally referred by Dr. Farlow. If this disposition is the correct one we have in *Keithia* a genus of strictly parasitic fungi in a family otherwise almost exclusively saprophytic.

The genus may be characterized as follows:

A genus of the Stictidiaceae parasitic on leaves of conifers. Ascomata erumpent, rupturing the epidermis either laciniately or in the form of a scale, bright-colored to dark. Spores 2 or 4, becoming olive-brown, divided into two unequal cells by a septum near one end.

SYNOPSIS OF SPECIES

Spores 4 in each ascus.

Epidermis ruptured laciniately, on *Juniperus*.

1. *K. tetraspora*.

Epidermis ruptured in the form of a scale, on *Tsuga*.

3. *K. Tsugae*.

Spores 2 in each ascus, epidermis rupturing by a scale, epispore punctate, on *Thuja*.

2. *K. thujina*.

I. KEITHIA TETRASPORA (Ph. & Keith) Sacc. Syll. 10: 49. 1892

Phacidium tetrasporum P. & K. Gard. Chron. N. S. 14: 308. 1880.

Didymascella Oxycedri Maire & Sacc. Ann. Myc. 1: 418. 1903
(fide Maire, Bull. Soc. Myc. Fr. 21: 140. 1905).

Hypophyllous, erumpent, ascomata at first buried beneath the epidermis, then breaking through and rupturing the epidermis by 3-4 laciniae, seated in the midst of a small, circular, yellowish-brown spot; the pustule elliptical, .75-1 mm. long, .5 mm. wide; disk brownish-black. Asci clavate, $175 \times 16-18 \mu$, apex rounded, not blue with iodine. Spores 4, uniseriate, at first hyaline, later becoming olive-brown, ellipsoid to piriform-ellipsoid, the smaller end occasionally prolonged to form a short beak-like projection, divided by a septum close to one end into two very unequal cells, the smaller being as often distal as proximal, $21-24 \times 13-16 \mu$. Paraphyses cylindric, hyaline below, septate, 2-3 μ thick, the apex clavate, olive-yellow, 8-9 μ thick.

On living leaves of juniper (*J. communis*, probably), Forres, Scotland, 1880, Rev. J. Keith.

Phillips described the fungus as occurring on the upper side of the leaf, but in the twenty-five or more infected leaves examined it is hypophyllous without exception. I have seen no reference to other collections of this species before 1903. In that year a parasite of *Juniperus Oxycedrus*, from Corsica, was described under the name *Didymascella Oxycedri*, by Maire and Saccardo. I have not seen specimens of this fungus, but Maire, following the suggestion of Patouillard, later came to the conclusion that it does not differ from *Keithia tetraspora*.

The erumpent ascomata remind one strongly of the pustules of some *Puccinia*. Sometimes as many as three ascomata may appear on a single leaf of the host. The spores are quite similar to those of *K. thujina*, but there are four in each ascus, the septum is not quite so close to one end, and the walls are not pitted. The lacinate rupturing of the epidermis is distinctive, as well as the dark color of the hymenium.

2. *Keithia thujina* sp. nov.

Ascomata epiphyllia, erumpentia, orbicularia vel elliptica, pulvinata, olivacea vel brunneo-olivacea, 1-1.25 mm. longa, .5 mm. lata; epidermis supra integra non laciniatim decidens. Asci clavati, 80-100 \times 18-20 μ . Sporae duae, brunneo-olivascetes, elliptico-piriformes, septo ad apicem anteriorem inaequaliter divisae, punctatae, 22-25 \times 15-16 μ . Paraphyses furcatae, septatae, clavato-incrassatae, olivaceae.

Ascomata epiphyllous, erumpent, at first buried beneath the epidermis which is lifted up, breaks around the margin, and finally falls away as an entire flap or scale, exposing the ascoma in the form of a cushion-like elevation. Ascomata circular to elongate-elliptic in outline, straight or curved, convex above, having the form of depressed cushions which are raised slightly above the surface of the substratum, .5 mm. broad, up to 1.25 mm. long; disk olive to olive-brown. Asci clavate, stout, 80-100 \times 18-20 μ , opening by a pore, not blue with iodine. Spores 2, placed end to end, at first hyaline, finally becoming olive-brown, broadly ellipsoid or piriform-ellipsoid, the smaller end uppermost, at first continuous, finally divided by a single transverse wall close to the distal end into two very unequal cells, epispore with minute pits over its whole surface, 22-25 \times 15-16 μ . Paraphyses branched below, septate, strongly clavate-thickened in the distal third, cohering, somewhat longer than the asci, 2-3 μ thick below, 5-8 μ thick above, olive.

On living leaves of *Thuja occidentalis*, Mellen, Wisc., 14 July, 1908 (Durand no. 6259, type); Oconto Co., July, 1909 (Durand no. 6910), *Dr. J. J. Davis*.

This species differs from *K. tetraspora* in the 2-spored asci, pitted spores, olive hymenium and the method of rupturing the covering epidermis. The fungus attacks the young, living foliage so that the scale-like leaves turn brown and die. In old specimens the ascomata fall out, leaving a hole extending nearly through the leaf. The septum in the spore is not always evident with low or medium powers of the microscope, but comes out best under an oil immersion objective. The same is true of the markings of the epispore, which consist of minute pits extending about half way through the wall. Such pit-like markings are quite unique in either the Phacidiaceae or Stictidiaceae.

The parasite does not seem to have any visible effect on the vigor of the tree, according to Dr. Davis's observations, since it destroys only a limited amount of leaf-tissue. Experience with other fungous diseases, however, leads one to suspect that under favorable conditions, or in certain seasons, it might become serious.

3. *Keithia Tsugae* Farlow

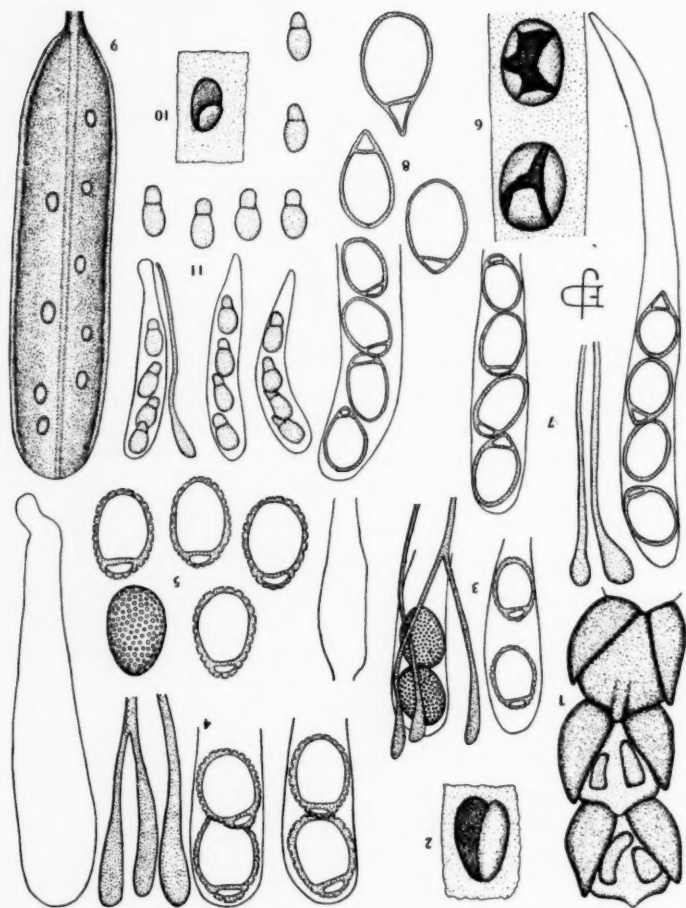
Stictis Tsugae Farlow, Appalachia 3: 245. 1883.

Propolidium Tsugae (Farlow) Sacc. Syll. Fung. 8: 668. 1889.

Hypophyllous, numerous, scattered; ascomata minute, at first buried beneath the epidermis which is finally ruptured and turned to one side as a scale, becoming more or less elevated and cushion-like, dark brown, orbicular to elliptic, .3-.5 mm. in diameter. Asci oblong-clavate, apex rounded, not blue with iodine, 58-65 \times 13-16 μ . Spores 4, uniseriate, at first hyaline, finally becoming greenish brown, ellipsoid-ovoid, divided by one septum into two unequal cells of which the proximal is smaller, constricted at the septum, 13-16 \times 6-8 μ , smooth. Paraphyses cylindric, septate, hyaline below, the tips clavate, olive-brown, 4-5 μ thick.

On living and dead leaves of *Tsuga canadensis*. New Hampshire: Shelburne and Lake Sunapee, July-Sept., *Dr. W. G. Farlow*; Wisconsin: Price Co., 13 Sept., 1911, *Dr. J. J. Davis*.

I have examined a portion of the type of this species kindly placed at my disposal by Dr. Farlow, as well as other specimens from his collection in the herbarium of the New York Botanical



1-5. *KEITHIA THUJINA* Durand

6-8. *KEITHIA TETRASPORA* (Ph. & Keith) Sacc.

9-11. *KEITHIA TSUGAE* Farlow

Garden. The material from Lake Sunapee is more mature than the rest, and shows spores conspicuously colored. This character, as well as the tetrasporous asci and the spores divided into two very unequal cells, indicates its close relationship to *K. tetraspora* and *K. thujina*. The covering epidermis falls as a scale as in the last named species.

Dr. Davis's recent collections are also mature and agree in all respects with those from New Hampshire.

Dr. Farlow informs me that since he first found it, in 1882-3, he has secured more mature material in several localities, which has quite modified his original view regarding this species. In the type the spores are immature and hyaline, and through an error were described as 8-spored instead of 4-spored. Comparison with authentic *Keithia tetraspora*, in Europe, convinced him that his *Stictis Tsugae* is congeneric, and should be called, therefore, *Keithia Tsugae*.

The same writer speaks of the parasitism of this species as follows: "The fungus appears only on the under side of the leaves, which turn brown and quickly fall. It was first noticed in August, 1882, on a tree affected with *Peridermium Peckii*. In September, 1883, it was found on a large number of trees, and had nearly destroyed the foliage. It may be considered a disease which does considerable harm."

On the basis of observations recently made upon this species in Wisconsin, Dr. Davis entertains some doubts about its parasitic nature. He has found no instances in which it appeared on undoubtedly living leaves, and he is convinced that it is not so certainly parasitic as is *K. thujina*.

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EXPLANATION OF PLATE LXXXI

Keithia thujina. Fig. 1. Portion of branch of *Thuja* showing four ascomata. $\times 6$. Fig. 2. Single ascoma much enlarged showing the epidermal scale falling away. Fig. 3. Asci, paraphyses and spores. Figs. 4-5. Asci, paraphyses and spores drawn with the oil immersion objective.

Keithia tetraspora. Fig. 6. Portion of leaf of *Juniperus* showing two ascomata exposed by the stellate splitting of the epidermis. Fig. 7. Three asci, paraphyses and spores. Fig. 8. Three spores more highly magnified.

Keithia Tsugae. Fig. 9. Leaf of *Tsuga* showing nine ascomata, much enlarged. Fig. 10. Single ascoma greatly enlarged exposed by falling epidermal scale. Fig. 11. Asci, paraphysis and spores.

TYPE STUDIES IN THE HYDNACEAE¹

III. THE GENUS SARCODON

HOWARD J. BANKER

The name *Sarcodon* was first proposed by Quélet in Cooke and Quélet, *Clav. Syn. Hym. Eur.* 195. 1878, but as no binomials were formed the name was not established as a genus until later taken up by Karsten. Whether we follow Quélet or Karsten in our conception of the genus, the type species is *Hydnum imbricatum* L.

SARCODON RETICULATUS Banker, *Mem. Torrey Club* 12: 139. 1906

Hydnum fragile Fries, *Nya Svamp. in Ofvers. af Kongl. Vetensk.*

Ak. Forhandl. 1851: 53. 1852; not *H. fragile* Persoon, *Syn. Meth. Fung.* 561. 1801.

The type of this species is "Copp 3716" deposited in the New York Botanical Garden herbarium. The specimen was collected in Iona, New Jersey, and is a part of the only collection of the species made in this country. Specimens of the plant sent to M. C. Cooke were referred by him to *Hydnum fragile* Fr. The Friesian name is untenable as it is preoccupied by *H. fragile* Pers. applied to a resupinate form. No type of *H. fragile* Fr. was found at Upsala, but European plants apparently identical with the American form are uniformly referred there to *H. fragile* Fr. At Kew specimens were found, collected in England, identical in every respect with the New Jersey plants even to the adherence of pine needles to the pileus indicating a similar habitat. At Upsala there was found a specimen collected at Mustiala, Finland, by P. A. Karsten, that had all the characters of our type except that it had a long somewhat fusiform stem, 2×8 cm., raising the pileus well up from the earth. This feature has not been observed in any other specimens.

¹ Investigation prosecuted with the aid of a grant from the Esther Herrman Research Fund of the New York Academy of Science.

SARCODON ACRE Quélet, Ench. Fung. 188. 1886

Hydnum acre Quélet, Bull. Soc. Bot. France 24: 324. pl. 6. f. 1. 1877.

Hydnum cristatum Bres. Atkinson, Jour. Myc. 8: 119. 1902.

The type of *H. acre* Quél. has not been seen. A specimen, however, has been received from G. Bresadola which that eminent mycologist had compared with Quélet's type and regards as an authentic representative of the species. This specimen does not appear to me to differ in any respect from authentic specimens of *Hydnum cristatum* Bres., received from Professor George F. Atkinson, which are a part of the type collection. The acrid taste noted in both the European and the American plants confirms the diagnosis of their identity, as this character is not common in the Sarcodons. A specimen at Kew contributed by Quélet has all the characters of our American forms. There seems to be no good reason to maintain *H. cristatum* Bres. as a distinct species.

The plant appears to be most abundant in Connecticut and Long Island.

***Sarcodon radicans* sp. nov.**

Sarcodon fuligineo-violaceus Banker, Mem. Torrey Club 12: 142. 1906; not *Sarcodon fuligineo-violaceus* (Kalch.) Quél. Ench. Fung. 189. 1886.

Hymenophore terrestrial, mesopodous, gregarious, small, 3-4 cm. high, brownish; pileus subconvex, uneven, somewhat irregular, 4-6 cm. wide; margin thin, sterile, decurved; surface subpubescent to smooth, sometimes with small innate scales, light-brown or ochraceous-brown with darker areas; substance fleshy, somewhat tough, light-brown, lighter than the surface; stem subflexuose, somewhat inclined, excentric to central, solid, subeven, abruptly narrowing below to a slender root-like base, 2-2.5 cm. long, 1-1.5 cm. wide; teeth fine, terete, tapering, decurrent more or less scatteringly to the base, seal-brown to flesh color at the tips, when dry a uniform tawny-brown, short teeth scattered about among the long, 1.5-2 mm. long, 0.1-0.2 mm. wide, 9-12 to a square mm.; spores subglobose, tuberculate, 4-5.5 μ wide, brown; hyphae of trama hyaline, smooth, thin-walled, collapsing when dried, recovering slightly in KOH, forming an intricate tangle, scarcely separable in KOH, septate, without clamp-connections, segments irregular, more or less inflated, 9-12 μ wide, 40 μ or more long; taste mild; odor of slippery elm.

On earth in mixed woods, late summer and autumn, Schaghticoke, N. Y.

The type of the above described species is in the writer's herbarium from *Hydnum fuligineo-violaceum* Kalch., although Kalchbrenner's *Hydnum fuligineo-violaceum*, though not with entire confidence. Since then specimens have been received from Abbate G. Bresadola which that distinguished mycologist collected in Trient and compared with Kalchbrenner's type. These plants are manifestly very different from the American forms described above. At Upsala two specimens were observed collected in Hungary and contributed by Kalchbrenner himself. These plants appeared to have the characters of Bresadola's specimens, but were smaller, approaching in size the American plants. They confirmed the diagnosis that the above described species is distinct from *Hydnum fuligineo-violaceum* Kalch., although Kalchbrenner's figure² closely resembles the appearance of our plants.

SARCODON LAEVIGATUS (Sw.) P. A. Karsten, Rev. Myc. 3¹: 20. 1881

Hydnum laevigatum Sw. Kongl. Vetensk. Acad. Handl. 1810: 243. 1810.

Hydnum bubalinum Pers. Myc. Eur. 2: 161. 1825.

There is probably no type of *H. laevigatum* Sw. in existence. At least I have not been able to locate any of Swartz's specimens. In the European herbaria very little material was found referred to this species and none that could be regarded as having much weight in determining the authentic characters of the species. The American plants which we have referred to this species conform well to the few European plants that we have seen and appear to have all the characters ascribed to the species.

Hydnum bubalinum Pers. is represented in Persoon's herbarium at Leyden by a single specimen sent by Chaillet. The plant appears to be the same as our specimens of *H. laevigatum* Swartz.

SARCODON IMBRICATUS (L.) P. A. Karsten, Rev. Myc. 3¹: 20. 1881

Hydnum imbricatum L. Sp. Pl. 2: 1178. 1753.

Hydnum cervinum Pers. Obs. Myc. 1: 74. 1796.

² Kalchbrenner, Icon. Hym. Hung. pl. 32. f. 2.

There is of course no type of *H. imbricatum* L. in existence. At Upsala a number of specimens of European plants, mostly from Scandinavia and Finland, were found referred to this species by Fries, Karsten, and others. These were uniform in character and most closely resembled the large coarse-scaled American forms as figured by F. E. Clements, Minnesota Mushrooms 104. f. 69.

No type of *H. cervinum* Pers. was found at Leyden, but from the description the species does not appear to be distinct from *H. imbricatum* L. and was so regarded by Persoon himself, see Syn. Meth. Fung. 554.

***Sarcodon Murrillii* sp. nov.**

Hymenophore terrestrial, mesopodous, medium to large size, reddish-brown; pileus expanded to infundibuliform, subrotund to irregular, 5-10 cm. wide, 1-2 mm. thick when dried; surface roughened with fine floccose scales, coarsest toward center, 1-2 mm. wide, ends upturned, about as long as wide, subzonately arranged, dark-reddish-brown on scales, lighter between; margin thin, fertile, repand, finely lobed or crenate, pallid; substance fleshy, pale-brown to whitish, drying thin, but somewhat tough and flexible; stem subcentral, strongly inclined, tapering gradually and then abruptly to the base, reddish-brown above, concolorous with pileus, paler below but becoming blackish at the base, scabrous roughened nearly to the base, apparently hollow or stuffed, 4-6 cm. long, 1-2 cm. wide; teeth small, slender, terete, tapering, acute, crowded, decurrent nearly to the base, reddish-brown, white tipped, 1.5 mm. or less long in dried plant, 0.15-0.25 mm. wide, 9-12 to a square mm.; spores subglobose, tuberculate, tubercles not prominent, pale-brownish, 6-7 μ wide; basidia prominent, irregular, clavate, 8-10 μ wide; sterigmata conical, curved, horn-shaped, 3-4 μ long; hyphae of trama hyaline, smooth, thin-walled, collapsing when dried, recovering in KOH, subparallel but partly separable in KOH, septate, without clamp-connections, segments short, stout, constricted at the septa, irregular, 10-28 μ wide by 20-70 μ long; hyphae of the teeth very slender, tubular, rarely septate, 3-4 μ wide.

The type of the species is *Murrill and House 397*, Transylvania, North Carolina, deposited at the New York Botanical Garden.

Many of the specimens distributed in Ellis, N. Am. Fung., "926 *Hydnum imbricatum*" are undoubtedly this species. I know that some of them are.

***Sarcodon fumosus* sp. nov.**

Hymenophore terrestrial, mesopodous, small, 3-5 cm. high, ash-gray to smoky; pileus plane to convex, 2-3 cm. wide, 2-3 mm. thick; surface even, subpubescent, ash-gray to smoky-olivaceous-brown when dried; margin thin, fertile, minutely serrate; substance fleshy-spongy when fresh, somewhat tough, flexible, compact, subwaxy toward surface, soft fibrous within, olivaceous, when dried; stem slender, subcentral, inclined or curved, attenuate upward, subpubescent at base to glabrous shining toward the cap, 2-4 cm. long, 3-10 mm. wide; teeth short, slender, terete, tapering, acute, uneven, not decurrent, pale to dirty-white, somewhat crowded, 2-5 mm. long or less, 0.2-0.4 mm. wide, 9-12 to a square mm.; spores dark, coarsely and densely tuberculate, ovoid, $7-9 \mu \times 9-11 \mu$ wide; basidia clavate to oblong, narrowing abruptly at the base, $7-10 \mu$ wide by $25-30 \mu$ long; sterigmata delicate, conical, incurved, $3-4 \mu$ long; hyphae of trama colored, dissolving out freely in KOH, becoming hyaline, slender, smooth, thin-walled, collapsing when dried, recovering slightly in KOH, forming an intricate tangle but slightly separable in KOH, septate without clamp-connections, segments extremely long, somewhat irregular, more or less constricted at the septa, $4-6 \mu$ wide; hyphae of the teeth very slender, parallel, $3-4 \mu$ wide; taste bitterish.

The type of the species is *Murrill and House 394*, North Carolina, deposited at the New York Botanical Garden.

***Sarcodon roseolus* sp. nov.**

Hymenophore terrestrial, mesopodous, gregarious, small to medium size, 4-6 cm. high, pale-rose-color; pileus plane to convex, 3-4 cm. wide, 0.5 cm. or less thick; surface pubescent and slightly imbricate, scaly, even, whitish tinged with old-rose; margin thin, incurved when dried; substance fleshy-tough, drying into two layers, an inner waxy or gummy, subtranslucent layer, and an outer dry, opaque, subfibrous layer; stem slender, subcentral, strongly inclined, subeven, slightly radicating, scabrous, 2-3 cm. long by 7-10 mm. wide; teeth very short, terete, tapering, acute, uniform, decurrent and abortive on the stem, not crowded, 0.3-0.7 mm. long by 0.1-0.2 mm. wide, 16-20 to a square mm.; spores pale-brown, tuberculate, ovoid, $4-5 \times 5-6 \mu$ wide; basidia clavate, four-spored, $5-6 \mu$ wide; sterigmata slender, capillary, 3μ long; hyphae of inner portion of pileus clouded, smooth, slender, thin-walled, collapsing when dried, recovering in water and KOH, forming a somewhat intricate and compact tangle, scarcely sepa-

able in KOH, septate, without clamp-connections, segments long, irregular, subtubular, 4-7 μ wide, contents granular; hyphae of outer portion of pileus more even, tubular, and coiled.

The type of this species is *Murrill and House 392*, North Carolina, in New York Botanical Garden. No other specimens are known.

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THE AGARICACEAE OF TROPICAL NORTH AMERICA—VI

WILLIAM A. MURRILL

The present article concludes the treatment of species with ochraceous or ferruginous spores begun in MYCOLOGIA for March, 1912. A portion of the generic key printed at that time appears below in a slightly revised form.

Volva and annulus absent.

Pileus centrally stipitate.

Lamellae adnate or decurrent.

9. GYMNOPIUS.

Pileus dimidiate or resupinate.

10. CREPIDOTUS.

Volva absent, annulus present.

Stipe glabrous or fibrillose.

11. PHOLIOTA.

Stipe squarrose-scaly.

12. HYPODENDRUM.

9. GYMNOPIUS Karst. Hattsv. 400. 1879

Flammula (Fries) Quél. 1872. Not *Flammula* DC. 1818.

A difficult cosmopolitan genus, with fleshy or fibrous stipe, adnate or decurrent lamellae, and usually abundant bright-ferruginous spores. Most of the species occur on decayed wood.

1. *Gymnopilus olivaceus* (Pat.)

Flammula olivacea Pat. in Duss, Enum. Champ. Guad. 55. 1903.

Known only from type specimens collected by Duss on dead wood at Basse-Terre, Martinique.

2. *Gymnopilus vinicolor* (Pat.)

Flammula vinicolor Pat. Jour. de Bot. 3: 339. 1889.

Collected by Duss on dead wood at Saint Pierre, Martinique. Pileus 1-2 cm. broad, deeply umbilicate, glabrous, red tinted with wine-color; lamellae close, large, scarcely decurrent; spores ovoid, smooth, ochraceous, $6-7 \times 3-4 \mu$.

3. *Gymnopilus lateritius* (Pat.)

Flammula lateritia Pat. Bull. Soc. Myc. Fr. 16: 176. 1900.

Described from specimens collected by Duss on dead wood at Pointe-Noire, Guadeloupe. Also collected twice by Duss on *Psidium* at Calebasse, Martinique.

4. *Gymnopilus parvulus* sp. nov.

Pileus convex to nearly plane, subcespitose, reaching 2-4 cm. broad; surface moist but not viscid, flavous-ochraceous when young, becoming somewhat darker with age, decorated with conspicuous, erect, pointed scales or fibrils which are isabelline to fulvous in color; margin striate, undulate, incurved on drying; context thin, pale-ochraceous, slightly bitter; lamellae narrow, subcrowded, adnate, sometimes with a decurrent tooth, isabelline to ferruginous-fulvous; spores ellipsoid, nearly smooth, ferruginous, $6-7 \times 4 \mu$; stipe stout, concolorous or darker, slightly blackish toward the base, especially on drying, fibrillose, solid, becoming hollow, rather fragile, 2-4 cm. long, 3-5 mm. thick; veil delicate, consisting of yellow fibrils, evanescent.

Type collected on a dead log at Castleton Gardens, Jamaica, October 28, 1902, *F. S. Earle* 222. Also collected near Port Antonio, Jamaica, December 17, 1908, *W. A. Murrill* 182, and in the Cockpit Country, Jamaica, January 12-14, 1909, *W. A. Murrill* & *W. Harris* 939, 952.

5. *Gymnopilus aureobrunneus* (Berk. & Curt.)

Flammula aureobrunnea Berk. & Curt. Jour. Linn. Soc. 10: 289. 1868.

Described from Wright's collections in Cuba. Spores subglobose to broadly ellipsoid, smooth, $5-7 \times 3.5-4 \mu$.

Cuba, *Wright* 64; *Candelaria*, Cuba, on a royal palm stump, *Earle* & *Wilson* 202.

6. *Gymnopilus aureoviridis* (Pat.)

Flammula aureoviridis Pat. in Duss, Enum. Champ. Guad. 55. 1903.

Described from specimens collected by Duss on dead wood at Camp Jacob, Guadeloupe.

7. *Gymnopilus helvoliceps* (Berk. & Curt.)

A. (Flammula) helvoliceps Berk. & Curt. Jour. Linn. Soc. **10**: 290. 1868.

Described from specimens collected by Wright in Cuba on rotten logs in woods. Said to be distinguished at once from *G. chrysopellus* by its much larger spores, which are oblong-ellipsoid, smooth or slightly punctate, ferruginous, $9-12 \times 5 \mu$. Duss reports the species from Guadeloupe and Martinique. Specimens from South Carolina placed in this category at Kew are incorrectly determined.

8. *GYMNOPILUS PENETRANS* (Fries) Murrill, Mycologia **4: 254. 1912**

Described from Sweden in 1815, and reported from Cuba and Australia. The only tropical specimens I have seen that appear to fit the species are those cited below, which indicates that it has crossed over from the mainland.

Troy and Tyre, Cockpit Country, Jamaica, *Murrill & Harris* 875, 1035.

9. *Gymnopilus subpenetrans* sp. nov.

Pileus broadly convex to expanded, rather thick, 2-4 cm. broad; surface moist, not viscid, slightly fibrillose, ferruginous-orange, margin rather thick, not striate; context whitish, mild but unpleasant to the taste; lamellae sinuate with a long-decurrent tooth, soon separating from the stipe; spores ellipsoid, punctate or nearly smooth, ferruginous, $8-10 \times 4-5 \mu$; stipe slightly tapering downward, concolorous, not paler below, somewhat fibrillose, solid with spongy interior, about 3 cm. long and 3 mm. thick.

Type collected on a dead royal palm trunk at Managua, Cuba, May 25, 1906, *C. F. Baker (Earle 526)*. Also collected on dead wood in the Cockpit Country, Jamaica, January 12-14, 1909, *W. A. Murrill & W. Harris 922*.

10. *Gymnopilus depressus* sp. nov.

Pileus convex to deeply depressed, gregarious or cespitose, reaching 8-10 cm. broad; surface dry, densely floccose-scaly, becoming subglabrous, dull-yellowish, at length dull-rusty-brown,

margin not striate, strongly inflexed on drying; lamellae short-decurrent, subdistant, broad, yellow to ferruginous; spores ellipsoid, minutely punctate, ferruginous, $7 \times 4 \mu$; stipe subcylindric, slightly enlarged at the apex and base, slightly paler than the pileus, yellowish above, minutely scaly-fibrillose throughout, fleshy, yellow within, solid when young, becoming fistulose with age, 4-8 cm. long, 6-10 mm. thick; veil delicate, consisting of yellow fibrils, evanescent.

Type collected on a dead log in Hope Gardens, Jamaica, November 16, 1902, *F. S. Earle* 499.

11. *Gymnopilus chrysotrichus* (Berk. & Curt.)

A. (Flammula) chrysotrichus Berk. & Curt. Jour. Linn. Soc. 10: 290. 1868.

Described from specimens collected by Wright in Cuba on dead logs in fields. The spores are subglobose to broadly ellipsoid, finely echinulate, melleous under a microscope, $5-7 \times 4 \mu$. Duss also reports the species from Guadeloupe and Martinique, and his specimens at Berlin appear to be correctly determined.

Cuba, *Wright* 26, 54; Guadeloupe, *Duss* 55; Martinique, *Duss* 1258.

12. *Gymnopilus chrysotrichoides* sp. nov.

Pileus thick, fleshy, convex to subexpanded, gregarious, reaching 7 cm. broad; surface dry or moist, not viscid, glabrous, ferruginous to fulvous, margin entire, concolorous, slightly sulcate with age, inflexed on drying; lamellae adnate with a decurrent tooth, broad, close, becoming ferruginous or fulvous; spores ellipsoid, punctate-tuberculate, ferruginous, $8-9 \times 5-6 \mu$; stipe cylindric, equal, usually somewhat curved, pallid, glabrous, longitudinally furrowed, at least above, 4-6 cm. long, 3-6 mm. thick, decorated near the apex with the remains of a rather large membranous, yellowish, usually permanent veil.

Type collected on a dead cocoanut log near Managua, Cuba, October 2, 1904, *F. S. Earle* 270. Similar to *G. chrysotrichus* in appearance, but considerably larger, with larger spores, and a rather large veil which remains as a distinct annulus. The species might be assigned to *Pholiota* if its affinities were not so evidently with *Gymnopilus*.

13. *Gymnopilus Earlei* sp. nov.

Pileus rather thick, tough, convex to expanded, cespitose, 3-6 cm. broad; surface dry, fibrillose and floccose-squamose, pale-ferruginous; margin uneven, somewhat fluted, not striate; context mild to the taste, said to be edible when young; lamellae adnate or subdecurrent, rather broad, subcrowded, ferruginous, darker than the surface of the pileus; spores ellipsoid, ferruginous, conspicuously punctate, $7-8 \times 4-5 \mu$; stipe cylindric, densely ferruginous-fibrillose, subconcolorous, solid, tough, horny, nearly black within, 4-6 cm. long, 4-8 mm. thick.

Type collected on cocoanut logs near Port Antonio, Jamaica, October 20, 1902, *F. S. Earle* 9. Reported by Earle to be common on cocoanut logs and stumps in the vicinity of Port Antonio, and said to be edible when young.

14. *Gymnopilus tenuis* sp. nov.

Pileus rather thin, convex to expanded, obtuse, cespitose, 3-10 cm. broad; surface pale-yellow to ferruginous, dry, fibrillose to floccose-scaly, at length subglabrous, margin thin, not striate, often uneven and undulate; lamellae decurrent, crowded, narrow, yellow to ferruginous; spores ellipsoid, ferruginous, minutely punctate, $7 \times 4 \mu$; stipe cylindric, slightly fibrillose, ferruginous-brown, often whitish at the base, hollow, the rind becoming hard and horny on drying, 4-6 cm. long, 3-8 mm. thick; veil of bright-yellow fibers, soon vanishing.

Type collected on a dead log of *Nectandra* near Port Antonio, Jamaica, November 24, 1902, *F. S. Earle* 612. Also collected on a cocoanut log near Port Antonio, Jamaica, November 23, 1902, *F. S. Earle* 594; on dead wood on Cooper's ranch at the base of El Yunque, near Baracoa, Cuba, March, 1903, *L. M. Underwood* & *F. S. Earle* 1136; and at Soldier's Road, New Providence, Bahamas, September 15, 1904, *E. G. Britton* 699. Broad and thin, with narrow, crowded lamellae and minutely punctate spores.

15. *Gymnopilus bryophilus* sp. nov.

Pileus convex, obtuse, gregarious, 2-5 cm. broad; surface uniformly ferruginous, dry, densely appressed-fibrillose, margin not striate; lamellae sinuate with a decurrent tooth, crowded, plane, broad, concolorous; spores subglobose, smooth, pale-ferruginous, $6 \times 5 \mu$; stipe cylindric, often eccentric, fibrillose, pale-fuscos, fleshy, solid, yellow within, 2-4 cm. long, 3-4 mm. thick.

Type collected on a decayed mossy log near Port Antonio, Jamaica, November 24, 1902, *F. S. Earle* 613. Distinguished by its densely fibrillose pileus and smooth, subglobose spores.

16. *Gymnopilus chrysopellus* (Berk. & Curt.)

A. (Flammula) chrysopellus Berk. & Curt. Jour. Linn. Soc. 10: 290. 1868.

Described from Wright's collections on dead wood in Cuba. Spores broadly ellipsoid, often nearly subglobose, smooth, mel-leous under a microscope, $6-7 \times 4-5 \mu$. Specimens bearing this name at Berlin, collected by Duss at Bains-Jaunes, are too badly discolored to be compared accurately.

17. *Gymnopilus Nashii* sp. nov.

Pileus convex, densely cespitose, 2-4 cm. broad; surface ochra-ceous, dry, densely floccose-squamose, margin not striate; lamellae adnate, subcrowded, broad, fuscous-ferruginous; spores ellipsoid, smooth, ferruginous, $7-7.5 \times 4-5 \mu$; stipe subcylindric, enlarged at the apex, concolorous, darker below, fibrillose, firm, fleshy, be-coming fistulose, 4-7 long, 3-6 mm. thick; veil pale-yellowish, scanty.

Type collected on an old log near Port Margot, Haïti, August 4, 1903, *G. V. Nash* 79. Also collected at Consuelo, Santo Do-mingo, November 15-17, 1909, *N. Taylor* 177; and at Sierra Nipe, Oriente, Cuba, January, 1910, *J. A. Shafer* 3761.

18. *Gymnopilus palmicola* sp. nov.

Pileus convex to expanded, at length depressed, cespitose, 2-5 cm. broad; surface dry, floccose-squamose, pale-ferruginous to ochraceous, margin even, not striate; lamellae adnate, subcrowded, broad, at length ventricose, ferruginous at maturity; spores ellip-soid, ferruginous, echinulate-punctate, $10 \times 6 \mu$; stipe cylindric, slightly fibrillose, subconcolorous but paler, solid, fleshy, yellowish within, 3-5 cm. long, 3-5 mm. thick; veil strongly developed, pale-yellowish, subannulate.

Type collected on dead logs of royal palm on Cooper's ranch at the base of El Yunque, near Baracoa, Cuba, March, 1903, *L. M. Underwood* & *F. S. Earle* 1134. Similar to *G. lateritius* in microscopic characters, but the pileus is much lighter in color.

19. *Gymnopilus hispidellus* sp. nov.

Pileus thin, convex, scattered or subcespitose, 2-4 cm. broad; surface pale-ochraceous, fibrillose, often punctate-squamose with erect, ferruginous scales, margin not striate; context slightly bitter; lamellae adnate, subcrowded, not uniform in breadth, yellow to fuscous-ferruginous; spores ellipsoid, fuscous-ferruginous, strongly punctate, $7 \times 5 \mu$; stipe cylindric, subfibrillose, concolorous with darker base, solid, 2-4 cm. long, 2-4 mm. thick; veil yellowish, subannulate.

Type collected on old logs on Cooper's ranch at the base of El Yunque, near Baracoa, Cuba, March, 1903, *L. M. Underwood & F. S. Earle* 429.

20. *Gymnopilus hispidus* (Mass.)

Flammula hispida Mass. Jour. Bot. 30: 161. pl. 323. f. 31-33. 1892.

Described from specimens collected by W. R. Elliott on decayed trunks at Chateau Belair, St. Vincent, West Indies. The pileus is ochraceous-fulvous, and conspicuously adorned with erect, acute squamules; the lamellae are broad, subdecurrent, and crowded; and the spores ellipsoid, smooth, ferruginous, $7 \times 5 \mu$.

21. *Gymnopilus areolatus* sp. nov.

Pileus thick, fleshy, convex, cespitose, 6-7 cm. broad; surface dry, imbricate-scaly, dirty-orange-yellow, margin entire; context yellowish-white, slightly bitter; lamellae adnate, separating from the stipe, subcrowded, broad, ventricose, often notched, yellowish-ferruginous; spores ellipsoid, ferruginous, tuberculate, $9-11 \times 6-7 \mu$; stipe cylindric, often curved, concolorous or paler, subglabrous, solid, 3-5 cm. long, 4-6 mm. thick.

Type collected on a hardwood stump in a field near Santiago de las Vegas, Cuba, May 27, 1904, *F. S. Earle* 36. Also collected on a palm stump at the same time and place, *F. S. Earle* 37; and on the base of a palm post at Herradura, Cuba, September 27, 1907, *F. S. Earle* 577.

22. *Gymnopilus pholiotoides* sp. nov.

Pileus firm, fleshy, convex, scattered, 3 cm. broad; surface ochraceous, cracking into scales, margin thin, not striate; context

yellowish-white, mild to the taste; lamellae short-decurrent, crowded, of medium width, pale-ochraceous to bright-ferruginous; spores ellipsoid, conspicuously echinulate, ferruginous, $9 \times 5 \mu$; stipe subcylindric, concolorous or paler, slightly fibrillose, solid, 3 cm. long, 5 mm. thick; veil thick, membranous, forming an annulus, at least in young sporophores.

Type collected on a dead royal palm trunk at Managua, Cuba, May 25, 1906, *C. F. Baker (F. S. Earle 527)*. The young sporophores show a well-developed annulus, as in *Pholiota*.

23. *GYMNOPILUS CARBONARIUS* (Fries) Murrill, *Mycologia* 4: 256. 1912

A terrestrial species common throughout temperate North America and Europe. It was found in ashy ground by a burnt log, growing in groups or clusters. The elevation of Chester Vale is 3,000 ft., just sufficient to insure a subtemperate climate. The fondness of this fungus for charcoal is quite remarkable. For a description and colored figure of the species, see *MYCOLOGIA* for July, 1912.

Chester Vale, Jamaica, *W. A. & Edna L. Murrill 287*.

24. *Gymnopilus jalapensis* sp. nov.

Pileus expanded, at length depressed at the center, reaching 8 cm. in breadth; surface smooth, moist, glabrous, cremeous at the margin, ochraceous near the center and ferruginous-isabelline to fulvous at the center, slightly greenish when bruised; margin curved downward and irregular or undulate; context white, mild, 5 mm. thick behind; lamellae adnate, close, ventricose behind, arcuate near the margin, stramineous, about 5 mm. broad; spores ellipsoid, smooth, subhyaline but with a distinct ferruginous tint, $6 \times 3.5 \mu$; cystidia abundant, flask-shaped, $60-75 \times 15 \mu$, mostly empty and hyaline, with short stalks and long, slender, septate necks filled with yellowish contents; stipe equal below, slightly enlarged at the apex, glabrous, stramineous, with a trace of a slight cortina at the middle, reaching 8 cm. long and 1 cm. thick.

Type collected on the ground in leaf-mold in a dense virgin forest near Jalapa, Mexico, December 12-20, 1909, *W. A. & Edna L. Murrill 78 (type)*, 81. The lamellae and spores are paler than in other American terrestrial species.

25. *Gymnopilus hypholomoides* sp. nov.

Pileus convex to expanded, 3-6 cm. broad; surface dry, sub-fibrillose, pale-fuscos, ferruginous at the center, margin thin, somewhat folded and uneven, not striate; context thin, yellowish, of mawkish flavor; lamellae inserted, crowded, rather narrow, sinuate, tawny-yellow to pale-fuscos; spores ellipsoid, fuscus, $7 \times 4 \mu$; stipe cylindric, curved, concolorous, fibrillose, solid, tough, 4-6 cm. long, 2-4 mm. thick.

Type collected on the ground, apparently attached to buried wood, on Rose Hill, Jamaica, 3,000 ft. elevation, October 24, 1902, F. S. Earle 53. The surface of the cap resembles that of *Hypholoma sublateritium*.

DOUBTFUL SPECIES

Agaricus (Flammula) peregrinus Fries, Elench. Fung. 1: 31. 1828. Collected by Benzon on trunks in Santa Cruz, West Indies. Types not found.

Agaricus (Flammula) ricensis Fries, Nova Acta Soc. Sci. Upsal. III. 1: 24. 1851. Collected by Oersted on the ground in Costa Rica. It was not figured, but a number of specimens were preserved, none of which could be found either at Upsala or Copenhagen. It differs from most tropical species of the genus in being terrestrial.

Gymnopilus sapineus (Fries) Murrill, Mycologia 4: 254. 1912. So closely related to *G. penetrans* that Fries combined the two in 1821, but later separated them again. Wright's Cuban collections referred to this species at Kew show considerable variation, but none seem to fit the temperate, pine-loving *G. sapineus*, which has also been reported from Guadeloupe, Venezuela, New Zealand, Ceylon, and elsewhere in tropical regions, probably without careful comparison with typical specimens.

10. *CREPIDOTUS* (Fries) Quél. Champ. Jura Vosg. 106. 1872

This genus contains small, fan-shaped, wood-loving plants with ochraceous or ferruginous spores. The pileus is usually pallid or yellowish, and may be either glabrous or more or less fibrillose or squamulose.

1. CREPIDOTUS CACAOPHYLLUS (Berk. & Curt.) Sacc. Syll. Fung.
5: 883. 1887

A. (Crepidotus) cacaophyllus Berk. & Curt. Jour. Linn. Soc. 10:
291. 1868.

Described from plants collected by Wright in Cuba. Types
not found at Kew. Pileus 1.3 cm. broad, yellowish, squamose;
lamellae adnexed, distant, chocolate-brown; stipe very short.

2. CREPIDOTUS MUSAECOLA (Berk. & Curt.) Sacc. Syll. Fung. 5:
883. 1887

A. (Crepidotus) musaecola Berk. & Curt. Jour. Linn. Soc. 10:
291. 1868.

Described from specimens collected by Wright in Cuba on dead
plantain leaves near the ground. Wright's Cuban specimens called
C. alveolus by Berkeley apparently belong here.

3. CREPIDOTUS PSYCHOTRIAE Pat. Bull. Soc. Myc. Fr. 18: 173.
1902

Described from specimens collected by Duss in Guadeloupe on
dead branches of *Psychotria glabrata*, and also found in Mar-
tinique. Pileus sessile, convex, orbicular, 0.5-1 cm. broad; sur-
face pale-ochraceous, glabrous, smooth, margin entire; lamellae
crowded, broad, brownish; spores ovoid, smooth, $8 \times 5 \mu$.

4. CREPIDOTUS CITRI Pat. Bull. Soc. Myc. Fr. 18: 172. 1902

Described from specimens collected by Duss at Camp Jacob,
Guadeloupe, and later found by him in Martinique. Pileus 2-6
mm. broad, orbicular, thin, soft, glabrous, smooth, brownish-
white; lamellae narrow, ochraceous; spores ovoid, smooth, pale-
yellow, $7 \times 4 \mu$.

5. *Crepidotus parvulus* sp. nov.

Pileus thin, soft, fleshy, resupinate, at first orbicular-reniform,
becoming conchiform and convex, gregarious, 1-4 mm. broad;
surface pure-white, dry, densely floccose-pulverulent, margin even;
lamellae radiating from an eccentric point, rounded behind, dis-
tant, thin, broad, white to yellowish-ochraceous; spores globose

or subangular, smooth, pale-ochraceous, 4-5 μ ; stipe none, point of attachment white, strigose.

Type collected on dead orange branches at Hope Gardens, Jamaica, October 31, 1902, *F. S. Earle 334*. The dried specimens much resemble those of *C. Dussii*, but the pileus is white instead of yellow and the spores only half as large as in that species.

6. *CREPIDOTUS DUSSII* Pat. Bull. Soc. Myc. Fr. 18: 173. 1902

Pileus 3-5 mm. broad, orbicular, chrome-yellow, glabrous; lamellae broad, distant, yellowish-brown; spores ovoid, smooth, 8-9 \times 6 μ . Types examined in the herbarium of Patouillard.

Baines-Jaunes, Guadeloupe, *Duss 411*; Deux-Choux, Martinique, *Duss 1414*.

7. *Crepidotus bicolor* sp. nov.

Pileus thin, rather firm, sessile, dimidiate or flabelliform, usually narrowed behind, the base not strigose, convex or applanate above, gregarious, 5-8 mm. broad; surface dry, glabrous or subglabrous, testaceous to lateritious, margin undulate, somewhat sulcate with age or on drying; lamellae radiating from the point of attachment, broad, distant, ventricose, ochraceous-ferruginous; spores globose or subglobose, smooth, ochraceous under a microscope, 6-7 μ .

Type collected on dead wood in British Honduras in 1906, *Morton E. Peck*. Very similar in form to specimens of *Crepidotus croceosanguineus* Mont. collected in Chile by Gay (type) and in Ecuador by Lagerheim, but in that species the colors are reversed, the surface being yellow and the lamellae dark-red.

8. *CREPIDOTUS PYRRHUS* (Berk. & Curt.) Sacc. Syll. Fung. 5: 879. 1887

A. (Crepidotus) pyrrhus Berk. & Curt. Jour. Linn. Soc. 10: 291. 1868.

Described from Wright's collections on dead wood in Cuba. His no. 38 is the type, and this is represented at Kew by two sporophores with globose or subglobose, echinulate, ochraceous-fulvous spores 4-5.5 μ . Lower down on the same sheet are three sporophores of no. 38a, which with no. 59 represent Berkeley's var. *leiospora*, having, according to him, smooth spores. Speci-

mens cited below from Guadeloupe and Jamaica agree with the type in spore characters, but the color of the spores is ferruginous-fulvous in fresh material. Patouillard has a specimen reaching 3 cm. or more in breadth.

Cuba, *Wright* 38; Guadeloupe, *Duss* 1110; Cockpit Country, Jamaica, *Murrill & Harris* 995.

9. *CREPIDOTUS LACERATUS* Pat. Bull. Soc. Myc. Fr. 18: 173. 1902

Described from specimens collected by Duss in Guadeloupe. Types examined. Pileus 1-1.5 cm. broad, deeply lacerate, ochraceous-red, pulverulent; lamellae crowded, concolorous; spores ovoid, verrucose, ochraceous, $5-6 \times 4-5 \mu$. Apparently not sufficiently distinct from *C. pyrrhus*.

10. *CREPIDOTUS CUNEIFORMIS* Pat. Bull. Soc. Myc. Fr. 18: 173. 1902

Known only from specimens collected by Duss on dead wood in Guadeloupe. Pileus about 1 cm. broad, pale-brown, glabrous, striatulate; lamellae broad, soft, brownish; spores globose, smooth, brown, 6μ .

11. *Crepidotus subcuneiformis* sp. nov.

Pileus thin, rather firm, fragile on drying, broadly wedge-shaped, approaching orbicular, in outline, plane above, tapering to a rather broad base which is not strigose, gregarious, reaching 1 cm. broad and becoming somewhat longer; surface glabrous or pulverulent, moist, dull-isabelline to avellaneous-isabelline, margin very thin, entire, not striate; lamellae radiating from the sessile base, subcrowded, plane, dull-yellowish to umbrinous; spores ovoid, smooth, melleous under a microscope, uniguttulate, $7-8 \times 5 \mu$.

Type collected on a decaying cocoanut husk in Grenada, West Indies, September, 1905, *W. E. Broadway*. Resembling *C. cuneiformis* in gross characters, but quite different under close observation.

12. *Crepidotus sulcatus* sp. nov.

Pileus reniform, dimidiate or resupinate, thin, soft, fleshy, gregarious, 1-2 cm. broad; surface white, becoming ochraceous when dry, glabrous, strigose at the base, sulcate-striate on the margin;

lamellae radiating from an eccentric or lateral point, crowded or subcrowded, rather broad, dark-ochraceous or pale-cinnamon; spores broadly ellipsoid, smooth, pale-cinnamon, $7-8 \times 6-7 \mu$; stipe none, pileus attached by a tuft of strigose hairs.

Type collected on dead fallen branches in Cooper's ranch at the base of El Yunque, near Baracoa, Cuba, March, 1903, *L. M. Underwood & F. S. Earle 761*.

13. *Crepidotus cinchonensis* sp. nov.

Pileus thin, soft, fleshy, convex to plane above, reniform to orbicular, gregarious, attached by a lateral or eccentric point, or by the vertex, sometimes strigose at the base, appearing resupinate when growing on the under side of a trunk, reaching 2 cm. in diameter; surface dull-watery-white, pulverulent to nearly glabrous, striate, margin very thin, pellucid, darker than the rest of the surface on drying; lamellae radiating from a lateral or eccentric point, crowded, thin, fragile, slightly ventricose, dull-watery-white, becoming subfulvous at maturity; spores ovoid to ellipsoid, smooth, pale-melleous under a microscope, 1-few-guttulate, $8-9 \times 4-5 \mu$.

Collected on dead branches of broad-leaved trees at Cinchona, Jamaica, 5,000 ft. elevation, December 25-January 8, 1908-9, *W. A. & Edna L. Murrill 610 (type)*, 654. Also collected during the same period at Morce's Gap, Jamaica, *W. A. & Edna L. Murrill 686*. Similar to *C. Citri* in form and general appearance but very much larger. Closely related to *C. sulcatus*, described from Cuba.

14. *Crepidotus aquosus* sp. nov.

Pileus resupinate, thin, delicate, reniform, expanded at maturity, 1-2.5 cm. broad; surface moist, glabrous or subglabrous, watery-brown, deeply sulcate on the margin; context soft and watery; lamellae subcrowded, rather broad, dark-ochraceous or subfulvous; spores globose, smooth, dark-ochraceous, $6-7 \mu$.

Type collected on a decayed log on Rose Hill, Jamaica, 4,000 ft. elevation, October 30, 1902, *F. S. Earle 293*.

15. *Crepidotus calolepidoides* sp. nov.

Pileus rather thick, fleshy, strongly convex above, concave below, solitary, narrowly attached behind, $2 \times 3 \times 1$ cm.; surface melleous with an ochraceous tint on the umbo, which is decorated

with minute, fulvous, conic elevations; margin striate, dull-brownish in dried specimens, being very distinct in color from the remainder of the surface; attachment of pileus white, finely pubescent or slightly strigose; lamellae broad, not crowded, slightly arcuate, cremeous to fulvous; spores ovoid, smooth, dull-melleous, $8-10 \times 5-6 \mu$.

Type collected on a small dead branch of a deciduous shrub on the Latimer trail, Cinchona, Jamaica, 5,000 ft. elevation, December 25-January 8, 1908-9, *W. A. & Edna L. Murrill* 556. Resembling *C. calolepis*, but with minute conic elevations instead of tomentose-scaly.

16. *Crepidotus substipitatus* sp. nov.

Pileus soft, fleshy, thin, very fragile when dry, orbicular-reniform, expanded, gregarious, about 1 cm. broad; surface moist, subglabrous, dull-ochraceous, not striate at the margin; lamellae adnexed, subcrowded, rather broad, ventricose, ochraceous to dull-cinnamon; spores ovoid or broadly ellipsoid, opaque, dull-cinnamon, minutely punctate, $5-6 \times 4 \mu$; stipe eccentric, short, curved, cylindric, glabrous, shining, dark-reddish-brown, 4-8 mm. long, 1 mm. thick.

Type collected on dead twigs on the ground at the base of El Yunque, near Baracoa, Cuba, March, 1903, *L. M. Underwood & F. S. Earle* 1236. When growing on the under side of sticks, the stipe curves so that the pileus appears resupinate.

17. *Crepidotus fumosifolius* sp. nov.

Pileus sessile, dimidiate or reniform, thin, firm, fleshy, expanded at maturity, scattered, 2-3 cm. broad; surface glabrous or slightly pruinose, whitish or with ochraceous tints, margin even; lamellae crowded narrow, becoming very dark-fuscous or almost purplish, resembling those of species of *Hypholoma*; spores ellipsoid or ovoid, dark-fuscous, $6-7 \times 4 \mu$.

Type collected on a dead log on Rose Hill, Jamaica, 4,000 ft. elevation, October 30, 1902, *F. S. Earle* 292. An anomalous species with lamellae much darker than is usual for the genus.

DOUBTFUL SPECIES

Crepidotus alveolus (Lasch) Sacc. Syll. Fung. 5: 877. 1887. Described in 1829 from specimens collected on beech trunks in

Germany. Reported from Wright's collections in Cuba, which apparently represent *C. musaecola*, and from Duss' collections in Guadeloupe. In assigning the name *C. alveolus* in 1892 to specimens from St. Vincent, West Indies, Massee remarks that they are larger and more crisped and lobed than in the European form, but that there exists no good specific or even varietal distinction between the two forms.

Crepidotus mollis (Schaeff.) Quél. Champ. Jura Vosg. 106. 1872. Described from northern Europe, and widely distributed, but not seen at Kew from the West Indies. Duss' specimens from Guadeloupe bearing this name were not examined.

II. PHOLIOTA (Fries) Quél. Champ. Jura Vosg. 91. 1872

This genus is distinguished by its fleshy stipe and well-developed veil, which forms a conspicuous and persistent annulus. The lamellae may be adnate or adnexed, and the spores vary in color from ferruginous to fulvous. The genus is abundantly represented in temperate regions, while the number of species reported from the tropics is comparatively small.

1. *Pholiota Broadwayi* sp. nov.

Pileus thin, fleshy, convex to expanded, solitary, reaching 3 cm. broad; surface moist or slightly viscid, entirely glabrous, nearly white to pale-isabelline, slightly darker at the center; margin thin, concolorous, entire; lamellae adnate or adnexed, rather narrow and crowded, slightly ventricose, pale-fulvous; spores ovoid, smooth, not apiculate, pale-yellowish-brown under a microscope, $12 \times 7-8 \mu$; stipe cylindric, equal, erect, concolorous, glabrous, smooth, hollow, 4-7 cm. long, 2-3 mm. thick; annulus superior, membranous, rather slight and apt to disappear with age.

Type collected on the ground in Grenada, West Indies, April 9, 1905, *W. E. Broadway*.

2. *Pholiota avellanea* sp. nov.

Pileus nearly plane, solitary, about 3 cm. broad and 3 mm. thick; surface smooth, glabrous, dull, pale-avellaneous, slightly darker at the center, margin thin, slightly decurved; lamellae adnate, avellaneous when looked at perpendicularly, close, rather narrow; spores ellipsoid, smooth, dull, pale-melleous, $9 \times 4-4.5 \mu$;

stipe enlarged below, crooked, white at the apex, hygrophanous and longitudinally streaked below, 5 cm. long, 4 mm. thick; annulus ample, white, superior, persistent.

Type collected on the ground at Morce's Gap, Jamaica, 5,000 ft. elevation, December 30, 1908, *W. A. & Edna L. Murrill* 749.

3. *Pholiota bryophila* sp. nov.

Pileus plane or slightly depressed, scattered, 2 cm. broad; surface smooth, dry, glabrous, isabelline, margin regular, appearing rather obtuse because of the broad gills; lamellae yellowish to brown, broad, adnate, ventricose; spores ovoid, smooth, deep-ochraceous, mostly uninucleate, $7-8 \times 3.5-4.5 \mu$; stipe cylindric, equal, often curved, smooth, glabrous, subconcolorous, slender and rather tough, 2 cm. long, 2 mm. thick; annulus white, conspicuous, persistent, attached slightly above the middle of the stipe.

Type collected among mosses on a moist limestone cliff at Orizaba, Mexico, 4,000 ft. elevation, January 10-14, 1910, *W. A. & Edna L. Murrill* 806.

4. *Pholiota cinchonensis* sp. nov.

Pileus thin, becoming plane, scattered, 1.5 cm. broad; surface ochroleucous to ochraceous, dry, granular-tomentose, striate, margin straight, even; lamellae adnate with a decurrent tooth, isabelline, rather narrow; spores broadly ovoid or ellipsoid, almost subglobose at times, obtuse at both ends, smooth, varying in content from granular to uninucleate, honey-yellow under the microscope, ochraceous in mass, $7 \times 4-5 \mu$; stipe paler than the pileus, cylindric, glabrous or nearly so, attached at the base to a white mat of mycelium, 1.5 cm. long, 1 mm. thick; annulus white, nearly central, sometimes ample, the stipe below being smooth, at other times more or less distributed in fibrils along the lower part of the stipe.

Type collected on a dead stick in woods at Cinchona, Jamaica, 5,000 ft. elevation, December 25, 1908, *W. A. & Edna L. Murrill* 432.

5. *PHOLIOTA UNICOLOR* (Vahl) Gill. Champ. Fr. 1: 436. 1878

Pileus hemispheric or campanulate, regular, scattered, 3 cm. broad; surface smooth, glabrous, dry, polished, ochroleucous, splitting at the margin, which is deflexed, straight, sharp, thin,

concolorous; lamellae sinuate-adnexed with a decurrent tooth, broad, close, soon becoming testaceous or latericeous; spores ovoid, pointed at both ends, 1-2-nucleate, pale-ochraceous, $8.5-11 \times 3.5-5 \mu$; stipe equal, cylindric, fibrous, stuffed, the surface glabrous and lustrous like asbestos, subconcolorous, whitish-tomentose at the base, marked at the apex with long gill-traces, 3-4 cm. long, 2-3.5 mm. thick; annulus superior, conspicuous, white.

Collected on dead wood in the Tepeite Valley, Mexico, 7,000 ft. elevation, December 28, 1909, *W. A. & Edna L. Merrill* 464. Several temperate species of fungi were found in that locality.

6. *PHOLIOTA MARTINICENSIS* Pat. in Duss, Enum. Champ.
Guad. 54. 1903

Described from specimens collected by Duss on a dead trunk in the forest at the base of Mt. Pelée, Martinique. Pileus about 1 cm. broad, very regular, reddish-brown, covered with minute scales; annulus very distinct, persistent, pallid; spores ovoid, smooth, brown, $6 \times 4 \mu$.

7. *Pholiota Musae* (Earle)

Phiotina Musae Earle, Inform. An. Estaç. Centr. Agron. Cuba
1: 241. 1906.

Pileus thin, watery, convex to expanded or depressed, cespitose, 1-4 cm. broad; surface glabrous, hygrophanous, dark-tan, paler when dry, margin at length striate; lamellae adnexed, subcrowded, broad, ventricose, subconcolorous to darker; spores ellipsoid, smooth, pale-fuscous, $15-18 \times 9-10 \mu$; stipe subcylindric, glabrous, shining, pure-white, hollow, 4-6 cm. long, 3-6 mm. thick; veil white, appendiculate or forming a slight, evanescent annulus.

Described from specimens collected on dead banana stalks at Santiago de las Vegas, Cuba, *F. S. Earle* 30, 71, 82.

8. *PHOLIOTA CUBENSIS* Earle, Inform. An. Estaç. Centr. Agron.
Cuba 1: 242. 1906

Pileus fleshy, firm, expanded, scattered or gregarious, 6-12 cm. broad; surface dry, dark-tan, floccose-scaly on the disk, areolate but not striate on the margin; context yellowish, mild but somewhat unpleasant; lamellae sinuate with adnate tooth, crowded, broad, dark-cinnamon; spores ovoid, smooth, melleous under a

microscope, usually 1-2-guttulate, $6-7 \times 4-5 \mu$; stipe subcylindric, slightly enlarged at the base, floccose above, glabrous below, pale-yellow, solid, firm, about 5×1 cm.; veil thick, yellowish, leaving an ample, persistent annulus fixed 2 cm. from the apex of the stipe.

Described from specimens collected on the ground under a building at Santiago de las Vegas, Cuba, *A. Meckleff* (*Earle 159*). Also collected later in a nearby field, *Earle 317*.

9. *Pholiota Brittoniae* sp. nov.

Pileus large, fleshy, convex to expanded, becoming depressed at the center, cespitose, reaching 10 cm. broad; surface dry, imbricate-fibrillose to subglabrous, fulvous, becoming fuliginous or blackish with age; margin entire, concolorous, strongly inflexed on drying; lamellae sinuate, with a decurrent tooth reaching as far as the annulus, seceding with age, broad, irregular in shape, subdistant, ferruginous, darker with age; spores broadly ellipsoid to subglobose, conspicuously tuberculate, ferruginous, opaque, $7-9 \mu$; stipe enlarged below, concolorous, blackening with age, longitudinally furrowed, hollow, reaching 10 cm. long and 1-3 cm. thick; annulus ample, membranous, ferruginous, persistent, fixed near the apex of the stipe; cystidia none.

Type collected about the roots of living *Eucalyptus* trees at Cinchona, Jamaica, 5,000 ft. elevation, October, 1908, *Elizabeth G. Britton 1122*. Also collected in the same locality at the base of a dead standing trunk, December 25, 1908, *W. A. & Edna L. Murrill 447*. Closely related to *Gymnopilus*, but having an ample, membranous, persistent annulus. Its nearest relative is probably *Pholiota ventricosa* Earle, described from California, which has smaller and more elongate spores.

12. *HYPODENDRUM* Paulet, Icon. 75. 1793

This genus is distinguished from *Pholiota* by its densely scaly stipe. The pileus may be scaly or smooth.

Hypodendrum scobifer (Berk. & Curt.)

A. (Pholiota) scobifer Berk. & Curt. Jour. Linn. Soc. 10: 289. 1868.

Described from young specimens collected by Wright about the roots of trees in Cuba. About 5 cm. high, pileus 1.2 cm. broad,

both it and the stipe conspicuously decorated with slender, conic, erect scales; spores not examined. Specimens so named in the herbarium of Patouillard, sent from Guadeloupe by Duss, are small, fulvous, very scrobiculate with imbricate scales, and have muricate, flavous spores $8-10 \times 4-5 \mu$. It is possible that these are young stages of a species of *Gymnopilus*.

ADDITIONAL DOUBTFUL SPECIES

These were unintentionally omitted in the last article of this series, when the group had to be divided for lack of space.

Agaricus (Galera) martianus Berk. & Curt. Jour. Linn. Soc. 10: 291. 1868. Described from Wright's collections on dead wood in Cuba and also reported from Guadeloupe. Types not seen. The description calls for free lamellae, which would take the species out of this genus.

Agaricus (Galera) macromastes Fries, Nova Acta Soc. Sci. Upsal. III. 1: 226. 1851. Described from plants collected by Krebs in the island of St. Thomas. Types doubtless destroyed. The species may belong to *Mycena*.

Agaricus (Galera) flocculentus? Fries, Nova Acta Soc. Sci. Upsal. III. 1: 24. 1851. Collected and figured by Oersted in Costa Rica. There can be little doubt that this is referable to *Conocybe tener*. The species referred to in Epicr. Myc. 209 is *Galera frustulentus*, now placed in *Psathyra*.

NEW COMBINATIONS

For the benefit of those using Saccardo's nomenclature, the following new species in the above article are recombined, as follows:

- GYMNOPILUS AREOLATUS = *Flammula areolata*
 - GYMNOPILUS BRYOPHILUS = *Flammula bryophila*
 - GYMNOPILUS CHRYSOTRICHOIDES = *Flammula chrysotrichoides*
 - GYMNOPILUS DEPRESSUS = *Flammula depressa*
 - GYMNOPILUS EARLEI = *Flammula Earlei*
 - GYMNOPILUS HISPIDELLUS = *Flammula hispidella*
 - GYMNOPILUS HYPHOLOMOIDES = *Flammula hypholomoides*
 - GYMNOPILUS JALAPENSIS = *Flammula jalapensis*
 - GYMNOPILUS NASHII = *Flammula Nashii*
 - GYMNOPILUS PALMICOLA = *Flammula palmicola*
 - GYMNOPILUS PARVULUS = *Flammula parvula*
 - GYMNOPILUS PHOLIOTOIDES = *Flammula phlotioides*
 - GYMNOPILUS SUBPENETRANS = *Flammula subpenetrans*
 - GYMNOPILUS TENUIS = *Flammula tenuis*
- NEW YORK BOTANICAL GARDEN

NEWS AND NOTES

Dr. Neil E. Stevens has been appointed forest pathologist in the Kansas Experiment Station.

The Simmons Bill, a national law regulating the importation of nursery stock, became effective October 1, 1912.

Miss A. E. Jenkins has been appointed scientific assistant in the pathological herbarium of the Bureau of Plant Industry at Washington.

A series of articles on "Edible Toadstools" is being contributed by Mr. McCubbin, of Guelph, to the *Ontario Natural Science Bulletin*.

Several new species of bacteria causing diseases of orchids were recently described by G. L. Pavarino (*Atti R. Accad. Lincei V.* 20: 233-237. 1911).

A course in city forestry is being offered by the New York State College of Forestry at Syracuse University, including a thorough course in forest pathology.

Mr. J. S. Cooley, assistant in plant pathology at the Virginia Agricultural Experiment Station, has a fellowship at the Missouri Botanical Garden this year.

Dr. Harry B. Humphrey, for three years professor of plant pathology in the State College of Washington, has been advanced to the position of head of the department of botany.

The Japanese chestnut has been found by A. Prunet, at Lindois, to be highly resistant, if not immune, to the black canker or root disease so fatal to the European chestnut.

The classification of the fungi according to their cytological and biological characters has been attempted by P. Vuillemin in one of a series of volumes devoted to fungi.

Insects play only a secondary rôle in the spread of ergot among forage grasses, according to results obtained by E. Gain (Compt. Rend. Soc. Biol. [Paris] 72: 189-191. 1912).

At the school of botany, University of Texas, Dr. I. M. Lewis has been promoted from instructor to adjunct professor and Dr. F. McAllister has been appointed an instructor in botany.

Two important papers on the relationship of the chestnut canker fungus, one by P. J. Anderson and H. W. Anderson and the other by C. L. Shear, appeared in *Phytopathology* for October, 1912.

Professor R. Kent Beattie, formerly head of the department of botany in the State College of Washington, has resigned to accept a position in the Division of Plant Pathology, Bureau of Plant Industry.

A disease of the beech in the Rhine region, which quickly kills trees seventy or eighty years old, is discussed by Dr. P. Magnus (Gesell. Naturf. Freunde Berlin 436-439. 1911), and declared to be due to *Armillaria mucida*.

In an article on some fungous diseases of the prickly pear (Ann. Myc. 10: 113-134. 1912), F. A. Wolf discusses *Sphaerella Opuntiae*, *Perisporium Wrightii*, *Hendersonia Opuntiae*, and several other less destructive species.

The very injurious effects of *Armillaria mellea*, which attacks the roots of a great variety of trees, are discussed by W. T. Horne (Mo. Bull. Com. Hort. Cal. 1: 216-225. 1912) and preventive measures of various kinds are suggested.

Professor R. B. Thaxter, of Harvard University, sailed for Trinidad October 11 to continue his researches on the Laboulbe-

niaceae. Professor Lyman, of Dartmouth College, will have charge of Professor Thaxter's work during his absence.

Dr. H. W. Anderson has been appointed Rose professor of botany at Wabash College, and Professor J. S. Caldwell, of the University of Nashville, has accepted the professorship of botany in the Alabama Polytechnic Institute, Auburn, Alabama.

Dr. F. J. Seaver accompanied Dr. N. L. Britton on a visit to the Bermudas in December and obtained a representative collection of the fungi of those islands. Comparatively little had been previously known of this group of plants in the Bermudas.

It is believed by Stockdale, of Barbados, that a number of fungi attacking Para rubber trees, such as *Thyridaria tarda*, *Hymenochaete noxia*, *Fomes semitostus*, and *Corticium salmonicolor*, may be introduced through the careless importation of rubber stumps.

The disease known as "peach yellows" is regarded by E. W. Morse and L. W. Fetzer (Science 35: 393. 1912) as a constitutional disease which is inheritable, the well-known symptoms being due to a disturbance of equilibrium among the enzymes of the plant.

An excellent descriptive treatment of the species of *Pholiota* occurring in the region of the Great Lakes, by Edward T. Harper, has recently appeared in the *Transactions of the Wisconsin Academy of Sciences*. Complete notes and very handsome plates of about thirty species are included.

Professor J. C. Arthur and Dr. Frank D. Kern spent a month during the past summer in field work in Colorado in continuation of their investigations of the Uredinales. The time was chiefly spent in the southern and southwestern portions of the state in localities not visited by them on previous trips.

Mr. Guy West Wilson, formerly of the North Carolina Agricultural Experiment Station, was awarded a research scholarship

at the Garden for the month of September to aid him in his researches on parasitic fungi. Mr. Wilson is continuing his work during the year as a graduate student of Columbia University.

C. Maublanc (Agr. Prat. Pays Chauds, 1912) describes a number of fungous diseases of vanilla, among them anthracnose due to *Calospora Vanillae*, brown spotting of the stems caused by *Nectria Vanillae*, rust caused by *Uredo Scabies*, leaf spots caused by *Fusicladium Vanillae*, *Phyllosticta Vanillae*, *Amerosporium Vanillae*, and *Ocellaria Vanillae*, and attacks by *Seuratia Coffeicola*, *S. Vanillae*, and *Cephaleuros Henningsii*.

A disease affecting the twigs of several species of elm, recently described by J. Eriksson (Myc. Centralbl. 1: 35-42. 1912), may be recognized by the small black pustules which dot the surface of the affected shoots. The causative fungus is described as *Exosporium Ulmi*. Careful inspection of nursery stock and the young growing trees and the burning of all dead and infected twigs are recommended as means of control.

A new paint-destroying fungus, described by Professor George Massee (Kew Bull. Misc. 325, 326. 1911) as *Phoma pigmentivora*, was found in England on fresh white paint in hothouses, appearing as pale rose-colored specks which increased in size and became darker in color until most of the paint was attacked and ruined. The presence of 2 per cent. of carbolic acid in the paint was found sufficient to prevent the development of the fungus.

Professor Thomas H. Macbride, professor and head of the department of botany, State University of Iowa, has been granted leave of absence for the year 1912-13, and is spending the time in botanical exploration in the western states. The latter part of the summer was spent in a mycological survey of the region near the snow line of Mt. Ranier with special reference to the Myxomycetes of that locality.

INDEX TO AMERICAN MYCOLOGICAL LITERATURE

Anderson, P. J., & Anderson, H. W. The chestnut blight fungus and a related saprophyte. *Phytopathology* 2: 204-210. O 1912.

Discusses the Connellsville fungus for which the name *Endothia virginiana* is proposed and concludes that we have in our territory (1) *Endothia radicalis* (Schw.) Fr., (2) the true blight, *E. parasitica* (Murrill), and (3) *E. virginiana*.

Banker, H. J. Type studies in the *Hydnaceae*—II. The genus *Steccherinum*. *Mycologia* 4: 309-318. 23 N 1912.

Steccherinum Peckii and *S. basi-badium* spp. nov. are described.

Brooks, C., & De Meritt, M. Apple leaf spot. *Phytopathology* 2: 181-190. pl. 17. O 1912.

A disease caused by *Sphaeropsis malorum*.

Coker, W. C. *Achlya DeBaryana* Humphrey and the prolifera group. *Mycologia* 4: 319-324. pl. 78. 23 N 1912.

Coker, W. C. *Achyla glomerata* sp. nov. *Mycologia* 4: 325, 326. pl. 79. 23 N 1912.

Detmers, F. An ecological study of Buckeye Lake. *Proc. Ohio Acad. Sci.* 5: 5-138. pl. 1-12 + f. 1-31. My 1912.

The annotated list of plants includes 19 species of fungi.

Detwiler, S. B. Some benefits of the chestnut blight. *Forest Leaves* 13: 162-165. O 1912.

Fawcett, H. S. Citrus scab, *Cladosporium citri* Massee. *Monthly Bull. State Comm. Hort. California* 1: 833-842. f. 253-260. O 1912.

Fawcett, H. S. Gum diseases in citrus trees. *Monthly Bull. State Comm. Hort. California* 1: 147-156. f. 49-53. Ap 1912.

Fawcett, H. S. The potato wart disease. *Monthly Bull. State Comm. Hort. California* 1: 733-736. S 1912.

A fungus disease caused by *Chrysophlyctis endobiotica* Schilb.

Fred, E. B. A study of the quantitative reduction of methylene blue by bacteria found in milk and the use of this stain in determining the keeping quality of milk. *Centralb. Bakt. Zweite Abt.* 35: 391-428. 30 O 1912.

Contains considerable information of a botanical nature.

Hall, J. G. *Monochaetia Desmazierii*. Mycologia 4: 330, 331. 23 N 1912.

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